

BOOK REVIEWS

HORNED BEETLES by Gilbert J. Arrow; edited by W. D. Hincks, Dr. W. Junk, Publishers, The Hague, 1951, 154 pp., 15 plates.

This book by the late Gilbert Arrow (1873-1948) of the British Museum (Natural History) is a general account of the occurrence and structure of horns in beetles and the biology of the species that possess them. Fifteen halftone plates illustrate 78 species, all but a dozen of which belong to the Scarabaeidae and Lucanidae. Most of the fantastic structures which Mr. Arrow studies he finds to be of no adaptive significance. They appear to reach their highest expression in species in which the males have no other function than to seek out and copulate with the females. Certain portions of their bodies, accordingly, especially the dorsal surfaces of the head and prothorax in the scarabs and the mandibles in the lucanids, are free to evolve fantastic growths. Mr. Arrow certainly leaves a lot still to be explained, but he does call attention to the fact that such horns do not develop in the female sex or on parts of the body in the male sex where they would interfere with the performance of essential functions of the species. For example, only where the mandibles are of on great use to the beetle, as in the male lucanids, do they become enlarged.

Two or three small categories of "horns" Mr. Arrow finds of adaptive significance. The excavated posterior end of certain Scolytidae and Platypodidae and the correspondingly excavated anterior ends of *Sinodendron* (Lucanidae) and a few genera of Scarabaeidae are used by the insects in pushing frass or freshly excavated debris out of their borrows. Usually only the body of the male is thus modified, in which cases there is apparently a division of labor between the sexes, the female doing the work of excavation, the male shoving out the debris as it accumulates. The males in some species of the scarabs that make ground burrows (*Bolboceras*, *Athyreus*) have horns that may assist them in climbing their burrows with a load of dirt on their heads! In the males of certain species in other genera (*Onthophagus*, *Pinotus*, *Catharsius*, *Phalops*, *Synapsis*) there is a short head horn for forming a flat surface by the combina-

tion of head and thorax, likewise for removing debris from the burrows.

In *Lethrus apterus* (Geotrupinae) the male has processes on the lower surfaces of the mandibles which may aid him in climbing plants for the tender shoots which he bites off and stores for the forthcoming brood in a burrow in the ground. Both sexes cooperate in making the borrow, but only the male climbs around the shoots!

Incidentally, Mr. Arrow has cited enough interesting information on the habits of dung beetles, including the Batesian mimicry in Africa of three species of *Gymnopleurus* by three species of *Onthophagus*, to suggest that an absorbing book could be made of a systematic survey of the varying habits of this group of beetles.

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Bibliographia

CURRENT LITERATURE

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This section is designed to contain all papers on the Coleoptera of North and South America which are not in the **Catalogue of the Coleoptera of America, North of Mexico** and its supplements, or in the **Checklist of the Coleopterous Insects of Mexico, Central America, the West Indies, and South America** and which have not been previously listed in The Coleopterists' Bulletin.

General

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